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OAK RIDGE NATIONAL LABORATORY

CENTRAL FILES NUMBER

48-11-289

B-137

Date November 16, 1948

File _____

Subject Waste Disposal Report for the
period November 12 to 26

Those Eligible
To Read The
Attached

By C.E. Winters

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To S. McLain

g a Swartout

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INTER-COMPANY CORRESPONDENCE

OAK RIDGE NATIONAL LABORATORY
(INSERT NAME) COMPANY CARBIDE AND CARBON CHEMICALS CORP. LOCATION Post Office Box P
OAK RIDGE, TENN.

TO S. McLain
LOCATION Building 703-A

DATE November 26, 1948

ANSWERING LETTER DATE

ATTENTION

COPY TO J.A. Lane-F.L. Culler, J.A. Svartout-
R.W. Stoughton, E.O. Wollan, K.Z. Morgan,
L. Balot, C.E. Winters, Files (2)

SUBJECT Waste Disposal Report for the
period November 12 to 26

I. Hot Pilot Plant-Vessel Vent Line

Fourteen consecutive days of sampling on the vessel vent line from the hot pilot plant has shown the average daily rate of flow of particles into the 205 stack to be about 0.5 milli-curie of gamma and 3 milli-curies of beta activity. The actual daily rate varied from about one tenth the average to three times the average. About 1/2 of the activity collected was found in the cyclone and 1/2 on the GMS paper. The average half life of the collected activity was shown to be greater than 1 month and probably much longer.

II. Hot Pilot Plant- Dissolver Line

Activity was measured for 4 consecutive days. The first two days showed negligible gamma and about 6 microcuries of beta. The second two days showed 40 microcuries of gamma and 22 microcuries of beta activity. Nearly all of this was found in the cyclone jar, indicating a particle size greater than 1 to 10 microns.

III. Hot Pilot Plant-Cell Vent Air

These results are a sum of the activity from the hot pilot plant, several isotope manufacturing operations, several hot hoods in an analytical laboratory, iodine operations in 706-B, and the vessel vent line from 706-B. Since 706-B was not in operation during the period reported, little activity is caused by this source for this period. The activity in this line is essentially all fine particles since the cyclone caught very little if any activity. The paper filter caught anything from 0 to 750 microcuries of gamma and 2 to 3750 microcuries of beta per day, of which one two day period was very much higher than the other two day periods. This coincided with a non-routine operation in the hot pilot plant. It is believed that the normal activity in this line exclusive of B building contribution is quite low. Additional data on this line after 706-B started operation will be found under that paragraph.

IV. 706-C Bldg. Slug Dissolving Line

Three days of sampling yielded an average of 1 millicurie of gamma and 4 millicuries of beta activity per day. When multiplied by 3, these results will represent the contribution of one slug dissolving in C Building. It should be pointed out that this operation is not continuous but occurs wherever the demand for radioiodine require operation of this facility.

V. Pile Cooling Air

a) Accelerated filter aging experiment

Nearly four weeks of operations of a filter unit operating on the pile outlet air, at an accelerated rate, have shown slight changes in pressure drop. The apparatus consists of 2 layers of FG-50 filter media operating at a flow rate double that in the actual filter building followed by one layer of CMS #6 paper operating at four times the rate. The pressure drops are given in inches of water.

	<u>Startup</u>	<u>4 weeks</u>
1st layer FG50	0.35	0.50
2nd layer FG50	0.25	0.30
3rd layer CMS #6	4.10	3.8

The pressure drop through the CMS paper reached a maximum of about 4.35 inches and has been slowly decreasing. The unit will be disassembled for visual inspection to ascertain if any obvious change has taken place to cause this drop in pressure differential.

b) Pile Cooling Air Filter House'

Experiments to determine the filter efficiency will start the week of November 29th. Data should be available about December 15th to 20th.

VI. Pilot Plant Evaporator for Radiochemical Waste Streams

The installation of the evaporator pilot plant is complete except for replacement of the vacuum jet. However, two water shake-down runs and one run with a dummy waste solution have been made already. No serious difficulties were experienced. An overall heat transfer coefficient of approximately 500 Btu/(hr)(Sq.Ft.)(°F) was obtained on these runs using 110 lb. steam. Water was evaporated at a maximum rate of 500 lbs. per hour.

The first data on active solutions are being taken Friday, November 26th. Continuous operation will begin Monday, November 29th.

VII. Detection of Slug Ruptures

After 35.5 days of continuous operation at 250°C and 91 shutdowns, one slug (No 1) in the 16 slug mock pile channel has ruptured

Slug No. 1 with a hole in the end weld had swollen from 1.17 in. diameter to 1.55 in. diameter before splitting its jacket in 2 places about 180° apart. They appeared at the same time and spread rapidly to about one-half inch in length. At this time the air flow rate through the channel was 64 ft/sec. - an easily detectable decrease of 3 ft/sec. from the flow at the start of the test.

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After slug #1 split all slugs were removed for photographs and measurements. The glass wool of the filter was removed and the uranium oxide leached out with nitric acid, but results are not yet available on the amount of oxide caught.

The test has been resumed and will be continued to observe the progress of the ruptured slug.

VIII. 706-D Building General

During the past week sampling units were in operation on the off-gas lines from 706-D building while a Rala run was in progress (11/17/48- 11/21/48). The sampling units consisted of a cyclone separator backed up with #6 GMS paper thru which a portion of the off-gas line flow was drawn.

The following information has been obtained to date:

VIV. 706-D Vessel Off-Gas Line

- (a) Sampling unit located in front of the line filter.

This unit sampled only about one half of the Rala run due to mechanical failure of the blower on 11/20/48. A portion of the filter paper was submitted to Chemistry on 11/26/48 (5 days after the completion of the run). The results from the GMS paper indicate a line activity of 710 millicuries. The cyclone sample, which has not been analyzed would add to this.

- (b) The vessel off-gas line flows into the larger cell ventilation duct from the hot pilot plant at the southeast corner of the 205 building. Thus the sampling unit on this duct would indicate the activity from the 706-D vessel off-gas line reaching this point. Samples submitted to Chemistry from this unit have not been analyzed at this time.

X. 706-D Cell Ventilation off-gas

No samples were removed from the sampling unit on this line until the completion of the Rala run. Approximately 24 hours after completion of the run, the cyclone sample was sent to Chemistry. The activity of the cyclone sample at this time was 50 μ r/hr. at contact with a cutie pie. Sampling rate was 1%.

On 11/23/48 (43 hours after completion of run) the GMS paper activity was 19.5 μ r/hr at 6 feet. (electroscope) On 11/26/48 a fraction of the paper was submitted to Chemistry. The results from only the GMS paper sample indicate a line activity of 3.7 curies for the entire run. The activity collected in the cyclone has not been determined.

XI. 706-D Dissolver Off-Gas

Two sampling units were used on this line. One unit was located just behind the 706-D building on the line in front of the filter. The second unit was located on the line at the base of the 205 stack. The following results have been obtained.

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(a) 26-D Building (Before Filter)

Period	11/17/48-11/18/48 (slag coating removal only)	11/18 - 11/20
Ave cyclone activity/day :	$\gamma = 1.44 \mu C$ $\beta = 16.3 \mu C$	$\gamma = \text{---}$ $\beta = \text{---}$
Ave. CWS paper activity/day:	$\gamma = 4.4 \mu C$ $\beta = 21.1 \mu C$	$\gamma = 57 \text{ millicuries}^*$ $\beta = \text{---}$
Ave Total activity/day :	$\gamma = 4.34 \mu C$ $\beta = 38.5 \mu C$	$\gamma = \text{---}$ $\beta = \text{---}$

* This value represents the line activity collected for the entire run.
Sample was analyzed 5 days after completion of the run

The cyclone sample obtained during the dissolving was spilled and lost. However, the CWS paper for the total period of dissolving is being analyzed by chemistry and the decay data is being obtained. On 11/23/48 (43 hours after the completion of the Rala run) the activity of this paper was 18 mr/hr at 6 feet. Sampling rate was approximately 50%.

(b) At 235 Stack (after filter)

Period	11/17/48 - 11/18/48 (during coating removal only)	11/18 - 11/21
Ave. cyclone activity/day :	$\gamma = 1.07 \mu C$ $\beta = 1.16 \mu C$	$\gamma = \text{---}$ $\beta = \text{---}$
Ave. CWS/6 activity/day :	$\gamma = 2.2 \mu C$ $\beta = 10.1 \mu C$	$\gamma = 16 \text{ millicuries}^*$ $\beta = \text{---}$
Ave. total activity/day :	$\gamma = 2.1 \mu C$ $\beta = 11.3 \mu C$	$\gamma = \text{---}$ $\beta = \text{---}$

* This value represents the line activity collected for the entire run.
Sample was analyzed 5 days after completion of run.

C. E. Winters